

*We claim:*

1. A seal plate, for substantially stopping fluid communication from a plurality of perforated wells of a multi-well block, or from a plurality of fluid outlets of a guide plate, said seal plate comprising:

5 a body having an upper major surface and a lower major surface; and  
a plurality of sealing elements depending from the upper major surface;  
wherein said seal plate is configured to seal said plurality of perforated wells or said plurality of fluid outlets when said upper major surface is registered with said multi-well block or said guide plate, respectively.

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2. The seal plate of claim 1, wherein the plurality of perforated wells consists of all wells of the multi-well block.

3. The seal plate of claim 2, wherein said guide plate is configured to establish  
15 fluid communication between each of said plurality of perforated wells of said multi-well block and each of said plurality of fluid outlets of said guide plate when said guide plate is registered with said multi-well block.

4. The seal plate of claim 3, wherein each of said sealing elements comprises a  
20 well, said well configured to matingly seal either a bottom portion of a corresponding perforated well of said plurality of perforated wells or a corresponding fluid outlet of

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said plurality of fluid outlets, when said seal plate is registered with said multi-well block or said guide plate, respectively.

5. The seal plate of claim 4, wherein each well of each of said sealing elements comprises an inner surface that circumscribes and forms a first fluid tight seal when mated with either said bottom portion of said corresponding perforated well of said plurality of perforated wells or said corresponding fluid outlet of said plurality of fluid outlets, when said seal plate is registered with said multi-well block or said guide plate, respectively.

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6. The seal plate of claim 5, wherein each well of each of said sealing elements comprises:

an orifice defining the opening at the upper portion of;

a first channel depending from the upper major surface of said seal plate; and

- 15 a bottom surface, said bottom surface enclosing the bottom portion of said first channel.

7. The seal plate of claim 6, wherein the bottom portion of said first channel depends from said lower major surface of said seal plate.

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8. The seal plate of claim 7, further comprising a second channel, said second channel depending from said upper major surface and circumscribing said upper portion

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of said first channel depending from said upper major surface, wherein a second fluid  
tight seal is formed when said seal plate is registered, via said upper major surface, with  
said guide plate whereby the inner surface of said second channel and the outer surface  
of a lower wall of said guide plate are mated, said lower wall circumscribing said  
5 corresponding fluid outlet.

9. The seal plate of claim 6, wherein said bottom surface is perforable by a  
corresponding protrusion on a second guide plate, when said second guide plate is  
registered with said lower major surface of said seal plate.

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10. The seal plate of claim 6, configured to mate another substantially identical seal  
plate.

11. The seal plate of claim 6, comprised of at least one of polystyrene, polyethylene,  
15 polypropylene, polyvinylidene chloride, polytetrafluoroethylene (PTFE),  
polyvinylidene fluoride (PVDF), glass-impregnated plastics, and stainless steel.

12. A multi-well assembly, comprising:  
a multi-well block having a plurality of wells, each well having a fluid-  
20 impermeable bottom surface;  
a guide plate defining a plurality of fluid passageways, each fluid passageway  
corresponding to a respective well of the multi-well block, the guide plate

being configured such that, whenever the guide plate is registered with the multi-well block, fluid communication is established between each well and an associated fluid passageway; and each of said plurality of fluid passageways having a fluid outlet; and

- 5           a seal plate, said seal plate have a plurality of sealing elements, each of said sealing elements corresponding to each outlet of said plurality of fluid passageways;

wherein registration of the seal plate with the guide plate substantially stops fluid communication from each outlet of said plurality of fluid passageways.

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13.     The multi-well assembly of claim 12, wherein each of said plurality of sealing elements comprises a substantially fluid-impermeable well.

14.     The multi-well assembly of claim 13, wherein the guide plate is also configured  
15    such that, whenever another substantially identical guide plate is registered with the seal plate, fluid communication is established between each well of said plurality of sealing elements and the associated fluid passageway of said another substantially identical guide plate.

- 20    15.     A method of performing iterative chemical or biological processes in a multi-well block, the method comprising:

- a) performing a first chemical or biological process in a plurality of wells of the multi-well block;
- b) perforating a lower portion of each of the plurality of wells of the multi-well block;
- 5 c) removing, via the perforated lower portion of each of said plurality of wells of the multi-well block, a first fluid portion of the contents of each of the plurality of wells of the multi-well block, while a first solid portion of the contents of each of the plurality of wells of the multi-well block remains;
- d) sealing the plurality of wells of the multi-well block; and
- 10 e) performing a second chemical or biological process in the plurality of wells of the multi-well block.

16. The method of claim 15, wherein perforating a lower portion of the plurality of wells of the multi-well block is accomplished via registration of a first guide plate with  
15 said multi-well block.

17. The method of claim 16, wherein sealing the plurality of wells of the multi-well block is accomplished via registration of a first seal plate with said first guide plate.

20 18. The method of claim 17, further comprising:

- f) perforating, via registration of a second guide plate with said first seal plate, a lower portion of a plurality of wells of the first seal plate after

performing said second chemical or biological process in the plurality of wells of the multi-well block; wherein said plurality of wells of the first seal plate correspond to the first plurality of wells of the multi-well block.

5     19.     The method of claim 18, further comprising:

g) removing, via the perforated lower portion of each of said plurality of wells of the first seal plate, a second fluid portion of the contents of each of the plurality of wells of the multi-well block; while a second solid portion of the contents of each of the plurality of wells of the multi-well block

10           remains;

h) sealing said plurality of wells of the multi-well block; and

i) performing a third chemical or biological process in the plurality of wells of the multi-well block.

15     20.     The method of claim 19, wherein h) comprises registration of a second seal plate with said second guide plate.

21.     The method of claim 20, wherein the plurality of wells of the multi-well block consists of all the wells of the multi-well block.

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22.     A method of performing iterative chemical or biological processes, the method comprising:

- a) performing a first chemical or biological process in a plurality of wells of a first multi-well block;
- b) perforating a lower portion of each of the plurality of wells of the first multi-well block;
- 5 c) removing, via the perforated lower portion of each of said plurality of wells of the first multi-well block, a first fluid portion of the contents of each of the plurality of wells of the first multi-well block, while a first solid portion of the contents of each of the plurality of wells of the first multi-well block remains;
- 10 d) sealing the plurality of wells of the first multi-well block;
- e) performing a second chemical or biological process in the plurality of wells of the first multi-well block;
- f) unsealing the plurality of wells of the first multi-well block;
- g) removing, via the perforated lower portion of each of said plurality of wells of the multi-well block, a second fluid portion of the contents of each of the plurality of wells of the first multi-well block, while a second solid portion of the contents of each of the plurality of wells of the first multi-well block remains;
- 15 h) sealing the plurality of wells of the first multi-well block;
- 20 i) dissolving the second solid portion of the contents of each of the plurality of wells of the first multi-well block in a solvent to make a solution in each of the plurality of wells of the first multi-well block;

- j) transferring, substantially, said solution from each of the plurality of wells of the first multi-well block to each of a corresponding well of a plurality of wells of a second multi-well block, via each perforation in said lower portion of each of said plurality of wells of the first multi-well block; and
- 5 k) performing a third chemical or biological process in the plurality of wells of the second multi-well block.

23. The method of claim 22, wherein a plurality of guide plates and a plurality of seal plates is used to perform said method.